

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of	:	
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Dongping Tao et al.	:	Confirmation No.: 4135
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Serial No.: 10/552,087	:	Group Art Unit: 1759
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Filed: October 4, 2005	:	Examiner: Tai, Xiuyu
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For:	:	
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ELECTROSTATIC PARTICLE CHARGER, ELECTROSTATIC SEPARATION SYSTEM, AND RELATED METHODS

APPEAL BRIEF

Mail Stop Appeal Brief - Patent
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Appeal is taken from the non-final rejections made in the Office Action mailed on February 15, 2011, at least some claims now having been twice rejected. Claims 1-6, 8, 10, 11, 22-26, 28-30, and 32-37 are pending and no claim has been allowed. A timely Notice of Appeal and fee were submitted to the Office on May 3, 2011. A fee transmittal indicating payment of the Appeal Brief Fee in the amount of \$270.00 accompanies this Appeal Brief in accordance with 37 C.F.R. §41.20(b)(2). It is believed no additional fees are due. However, the Commissioner is authorized to deduct any additional fees necessary from Deposit Account 11-0978. Based upon the arguments presented herein the Appellant respectfully requests remand to the Examiner with instructions for immediate allowance of all pending claims of the application.

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I. REAL PARTY IN INTEREST

The real parties in interest are the individual inventors, Dongping Tao, having a place of residence at 3246 Sebastian Lane, Lexington, KY 40513, and Xinkai Jiang, having a place of residence at 516 Townsend Ridge, Lexington, KY 40514.

II. RELATED APPEALS AND INTERFERENCES

Appellant knows of no prior or pending appeals, interferences, or judicial proceedings, which may be related to, directly affect, or be directly affected by, or have a bearing on, the Board's decision in this Appeal.

III. STATUS OF THE CLAIMS

Claims 1-6, 8, 10, 11, 22-26, 28-30, and 32-37 remain pending, stand rejected, and are appealed herein. Claims 1, 22, 30, and 33 are independent. On appeal, Applicant traverses the rejections of all pending claims.

Claim 34 is objected to under 35 U.S.C. §132(a) as allegedly introducing new matter into the disclosure.

Claim 34 stands rejected under 35 U.S.C. §112, 1st paragraph for allegedly failing to comply with the written description requirement.

Claims 1-4, 8, 10, 20, 23, 26, 28, and 34-37 stand rejected under 35 U.S.C. §103(a) as allegedly obvious over U.S. Patent No. 4,072,129 to Bright et al. (“Bright”) in view of U.S. Patent Application Publication No. 2002/0085977 to Fotland et al. (“Fotland”).

Claims 5, 6, 24, and 25 stand rejected under 35 U.S.C. §103(a) as allegedly obvious over Bright and Fotland and further in view of U.S. Patent No. 6,498,313 to Stencel et al. (“Stencel I”).

Claims 11 and 29 stand rejected under 35 U.S.C. §103(a) as allegedly obvious over Bright and Fotland and further in view of U.S. Patent No. 5,755,333 to Stencel et al. (“Stencel II”).

Claims 1-4, 8, 10-11, 22-23, 26, 28-30, and 32-37 stand rejected under 35 U.S.C. §103(a) as allegedly obvious over Stencel II in view of Bright and further in view of Fotland.

IV. STATUS OF AMENDMENTS

No amendment has been filed subsequent to the non-final Office Action dated February 15, 2011 and the Notice of Appeal filed on May 3, 2011, and all previous amendments have been entered. The form of the claims for purposes of appeal are those presented in the Amendment filed with the Request for Continued Examination electronically filed by the Appellant on March 15, 2010. As required, a copy of the claims is included herewith in the Claims Appendix, *infra*.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The claims under Appeal are generally directed to a system for separating particles from a fluid flow, and more specifically to a chamber including a rotor for frictionally charging particles in the presence of an electric field for enhancing the charging of particles.

Claim 1 is directed toward an apparatus for use in charging particles in a particle mixture for separating particles from a fluid flow (*p. 3, ll. 7-9*). The apparatus includes a chamber 14 with an inlet 12 for receiving the particle mixture (*Fig 2; p. 5, ll. 18-28*) and an outlet 20 for discharging the particle mixture (*Fig. 2; p. 6, ll. 4-5*). Additionally, the apparatus includes a tribocharging rotor 18 mounted in the chamber 14, the rotor having a generally non-permeable outer surface for contacting and frictionally charging the particles of the particle mixture (*Fig. 2; p. 5, l. 25 – p. 6, l. 2*). Further, the apparatus includes an electric field in the chamber for enhancing the charging of the particles (*p. 8; ll. 15-16*).

Claims 2-6, 8, 10, 11, and 34-37 depend from claim 1. Claim 2 adds to claim 1 the requirement that the rotor 18 be non-circular in cross-section (*Figs. 4a, 4b; p. 9, ll. 1-7*). Claim 3 adds the requirement that the chamber 14 define a generally annular space around the rotor 18 for receiving the particle mixture (*Fig. 2; p. 5, ll. 25-28*). Claim 4 adds the requirement that the outlet 20 be positioned below and generally opposite the inlet 12 (*Fig. 2*). Claim 5 adds to the apparatus the further element of a partition 24 projecting into the chamber 14 adjacent the rotor 18 for the dual function of preventing the particle mixture from prematurely entering the outlet 20 in one direction and guiding the particle mixture to the outlet in the other direction (*Fig. 2; p. 7, ll. 18-21*). Claim 6 depends from claim 5 and further adds the requirement that the partition 24 be adjustable to vary the distance between the end of the partition and the rotor 18 (*p. 7, l. 27 – p. 8, l. 2*).

Claim 8 adds to claim 1 the requirement that the rotor 18 rotates at a rotations speed of between about 1,200 and 10,000 revolutions per minute (*p. 6, ll. 14-16*). Claim 10 adds that the electric field is created by a variable voltage source 26 having a first lead connected to the rotor 18 and a second lead connected to a wall 16 of the chamber 14 (*Fig. 2; p. 8, ll. 16-18*).

Claim 11 is directed to a particle separation system including a feedstream for delivering the particle mixture to the inlet 12 of the apparatus of claim 1 and an electrostatic separator 100 (*Fig. 7*) for receiving the particle mixture from the outlet 20 and separating at least one species of particles from the particle mixture (*p. 9, ll. 11-15*).

Claim 34 adds to claim 1 the requirement that the outer surface of the rotor 18 be smooth and continuous (*Figs. 2, 4c; p. 5, l. 28 – p. 6, l. 2; p. 9, ll. 7-10*). Claim 35 requires that the rotor 18 comprise a cylinder (*Figs. 2, 4c; p. 8, l. 27 - 9, l. 10*). Claim 36 adds that the rotor is mounted to spin about a generally horizontal axis (*Fig. 2; p. 5, ll. 25-28*). Claim 37 adds the requirement that the rotor 18 not include any external blades (*Figs. 2, 4b, 4c; p. 9, ll. 3-10*).

Claim 22 is directed toward an apparatus for charging particles in a particle mixture as part of a system for separating particles from a fluid flow including the particle mixture. The apparatus includes a wall 16 forming a chamber 14 including an inlet 12 for receiving the particle mixture (*Fig 2; p. 5, ll. 18-28*) and an outlet 20 for discharging the particle mixture (*Fig. 2; p. 6, ll. 4-5*). Included in the chamber is a rotatable means 18 for frictionally charging the particles of the particle mixture (*Fig. 2; p. 5, l. 28 – p. 6, l. 2*). The apparatus further includes a means 26 for forming an electric field in the chamber (*p. 8; ll. 15-18*).

Claims 23-26 and 28-29 depend from claim 22. Claim 23 adds the requirement that the rotatable means comprises a rotor 18 rotatably mounted in the chamber, the rotor having a generally non-permeable outer surface (*Fig. 2; p. 5, l. 25 – p. 6, l. 2*). Claim 24 adds a partition 24 projecting into the chamber adjacent the means 18 for frictionally charging the particle mixture, the partition present for the dual function of preventing the particle mixture from prematurely entering the outlet 20 in one direction and guiding the particle mixture to the outlet in the other direction (*Fig. 2; p. 7, ll. 18-21*). Claim 25 adds the requirement that the partition 24 be adjustable to vary the distance between an end of the partition and the rotatable means 18 for frictionally charging the particles in the chamber (*p. 7, l. 27 – p. 8, l. 2*). Claim 26 adds to claim 22 a motor M for rotating the rotatable means 18 (*Fig. 2; p. 6, ll. 9-17*). In claim 28, the means for forming the electric field comprises a variable voltage

source 26 having a first lead connected to the means 18 for frictionally charging the particles and a second lead connected to the wall 16 (*Fig. 2; p. 8, ll. 16-18*).

Claim 29 is directed to a particle separation system including a feedstream for delivering the particle mixture to the inlet 12 of the apparatus of claim 22 and an electrostatic separator 100 (*Fig. 7*) for receiving the particle mixture from the outlet 20 and separating at least one species of particles from the particle mixture (*p. 9, ll. 11-15*).

Claim 30 is directed to a system for separating particles from a fluid flow and includes a feedstream including the fluid flow and a particle mixture comprising at least two species of particles (*p. 5, ll. 18-21*). The system further includes a wall 16 defining a chamber 14 including an inlet 12 for receiving the feedstream (*Fig 2; p. 5, ll. 18-28*) and an outlet 20 for discharging the particle mixture (*Fig. 2; p. 6, ll. 4-5*). Mounted in the chamber 14 is a rotor 18 having a generally non-permeable outer surface for contacting and assisting in charging the particles (*Fig. 2; p. 5, l. 28 – p. 6, l. 2*). Additionally, the chamber includes a first electric field for enhancing the charging of the particles (*p. 8; ll. 15-16*). The system also includes a separator 100 downstream from the chamber outlet 20 for separating at least one species of the charged particles from the particle mixture in the fluid flow (*Figs. 2, 7; p. 11, ll. 3-9*).

Claims 32 depends from claim 30 and adds the requirement that the separator include a second electric field (*p. 10, ll. 8-10*).

Claim 33 is directed to an improvement in a particle separation system including an electrostatic separator for separating one or more species of particles from a particle mixture included in a feed stream with a fluid flow. The improvement includes a chamber 14 with an inlet 12 for receiving the feed stream (*Fig 2; p. 5, ll. 18-28*) and an outlet for discharging the particle mixture to the electrostatic separator (*Fig. 2; p. 6, ll. 4-5*). The improvement further includes a rotor 18 rotatably mounted in the chamber 14, the rotor having a generally non-permeable outer surface for contacting and frictionally charging the particles prior to delivery to the electrostatic separator (*Fig. 2; p. 5, l. 28 – p. 6, l. 2*). The improvement also comprises an electric field in the chamber 14 (*p. 8; ll. 15-16*).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A. The objection to alleged new subject matter in the amendment submitted March 15, 2010.

B. The rejection of claim 34 under 35 U.S.C. §112, 1st paragraph as allegedly failing to comply with the written description requirement.

C. The rejection of claims 1-4, 8, 10, 22, 23, 26, 28, and 34-37 under 35 U.S.C. §103(a) as allegedly obvious over U.S. Patent No. 4,072,129 to Bright et al. (“Bright”) in view of U.S. Patent Application Pub. No. 2002/0085977 to Fotland et al. (“Fotland”).

D. The rejection of claims 5, 6, 24, and 25 under 35 U.S.C. §103(a) as allegedly obvious over Bright in view of Fotland and further in view of U.S. Patent No. 6,498,313 to Stencel et al. (“Stencel I”).

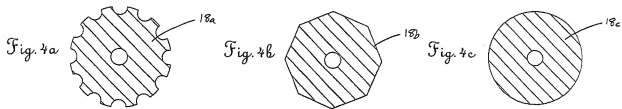
E. The rejection of claims 11 and 29 under 35 U.S.C. §103(a) as allegedly obvious over Bright in view of Fotland and further in view of U.S. Patent No. 5,755,333 to Stencel et al. (“Stencel II”).

F. The rejection of claims 1-4, 8, 10-11, 22, 23, 26, 28-30, and 32-37 under 35 U.S.C. §103(a) as allegedly obvious over Stencel II in view of Bright and further in view of Fotland.

VII. ARGUMENT

A. New Matter Under §132(a)

In the Office Action mailed February 15, 2011, the issue of “new matter” is raised in relation to the previous amendment to add new claim 34. *Office Action dated February 15, 2011, p. 2-3.* Specifically, the Action alleges that the specification does not disclose the requirement of claim 34 “wherein the outer surface of the rotor is smooth and continuous.”¹ Support for this objection is allegedly found in Figures 4a and 4b, which “illustrate[] the outer surface of rotor 18 with outwardly projecting portions.” *Id. at p. 3.* Figure 4c, however, plainly shows the rotor with a smooth and continuous surface:



These figures are part of the original description provided in the application. Accordingly, the Examiner’s position is lacking in factual support and thus the corresponding objection/rejection on this basis is subject to reversal.

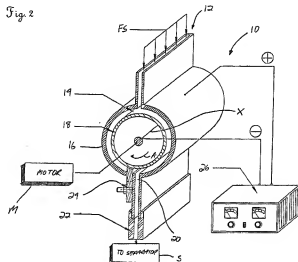
B. Rejection of Claim 34 Under 35 U.S.C. §112, 1st Paragraph

In the Office Action mailed February 15, 2011, claim 34 stands rejected under 35 U.S.C. §112, 1st paragraph as allegedly failing to comply with the written description requirement.

As stated above, the Office Action states that claim 34 contains subject matter which was not described in the specification as filed, namely that “the outer surface of the rotor is smooth.” *Office Action dated February 15, 2011, p. 3.* The Action further states that the specification “describes that the outer surface of rotor remains non-permeable or continuous

¹ Appellant recognizes that “new matter” objections are ordinarily addressed by way of petition. However, since the language allegedly qualifying as new matter is also present in at least one claim on appeal (namely, claim 34) subject to rejection under Section 112, first paragraph (See Argument Section B), it is believed that the issue is properly presented to the Board for consideration. See MPEP 608.04(c) (“... where the alleged new matter ... affects the claims, ... the question becomes an appealable one, and should not be considered on petition....”).

and Figure 4a and 4b illustrates the outer surface of rotor 18 with outwardly projecting surfaces.” *Id.* While Figures 4a and 4b of Applicant’s disclosure illustrate certain embodiments of the rotor in which the surface is not smooth, the specification does not limit the shape of the rotor to the shapes disclosed in these specific figures. In fact, Figures 2 (below) and 4c (above) each disclose a rotor of a generally circular cylindrical shape. *See also Application Specification p. 8, l. 27.*



Each of these figures depicts a rotor with a smooth and continuous outer surface as claim 34 requires. Therefore, claim 34 is adequately supported in the original specification in such a way as to reasonably convey to one skilled in the relevant art that at the time the application was filed, the inventors had possession of the claimed invention, in compliance with §112, 1st paragraph. Accordingly, Applicant respectfully requests reversal of the rejection.

C. Rejection Under 35 U.S.C. §103(a) Over U.S. Patent No. 4,072,129 to Bright et al. (“Bright”) in View of U.S. Patent Application Pub. No. 2002/0085977 to Fotland et al. (“Fotland”).

Substantively, claims 1-4, 8, 10, 20, 23, 26, 28, and 34-37 are rejected as allegedly obvious over U.S. Patent No. 4,072,129 to Bright et al. (“Bright”) in view of U.S. Patent Application Pub. No. 2002/0085977 to Fotland et al. (“Fotland”). Applicant traverses all rejections and submits that the claims are allowable as written.

Initially, Applicant submits that Bright cannot be used in an obviousness rejection because it is not analogous art. There are two separate tests to determine what constitutes analogous prior art: “(1) whether the art is from the same field of endeavor, regardless of the problem addressed and, (2) if the reference is not within the field of the inventor’s endeavor, whether the reference still is reasonably pertinent to the particular problem with which the inventor is involved.” *In re Bigio*, 381 F.3d 1320, 1325 (Fed. Cir. 2004). Here, Bright is directed toward an apparatus for depositing particles of a fluidized powder, which is clearly from a separate field of endeavor from Applicant’s invention of a particle separator. Therefore, the second prong of the *Bigio* test is the focus of the non-analogous art analysis.

The Federal Circuit has recently noted how narrow the field of art is that satisfies the second prong of the *Bigio* test if that art is directed to a wholly different problem than the one faced by the inventor. *In re Klein*, ___ F.3d ___ (Fed. Cir., June 6, 2011). In *Klein*, the invention at issue was directed toward a measuring cup with dividers for convenient and easy mixing of sugar and water in specific ratios to produce various nectar compositions specific for different animals. *Id.* The court held that five different references which disclosed containers with dividers for separating contents were not analogous prior art because they were not directed toward the problem faced by the inventor. That is, “[a]n inventor considering the problem of making a nectar feeder with a movable divider to prepare different ratios of sugar and water for different animals, would not have been motivated to consider any of these references when making his invention, particularly since none of these three references shows a partitioned container that is adapted to receive water or contain it long enough to be able to prepare different ratios in the different compartments.” *Id.* Therefore, even in the simple mechanical arts, if a reference is directed toward a different problem than the one faced by the inventor, it should fail the analogous art test.

Here, Applicant’s invention is directed toward “a charger for use in a system for separating particles from a fluid flow.” *Applicant’s Abstract*. Bright’s invention, on the other hand, is directed toward a machine for depositing powder. While both inventions include the general concept of triboelectric charging of particles, they are directed to wholly different problems. Much like in the *Klein* court’s holding that dividers creating

compartments for separating components does not alone constitute analogous prior art, the mere presence of triboelectric charging is not sufficient to support a finding of analogous art between Bright and Applicant's invention. That is, an inventor seeking to separate particles from a fluid flow would not look to a machine for deposition of powder to solve the problem at hand. Accordingly, Applicant respectfully requests withdrawal of all obviousness rejections based on Bright, as Bright fails the *Klein* test and is not analogous art.

Regardless, Applicant submits that the Office Action does not provide adequate support for combining Bright with Fotland to render Applicant's claims obvious. Under current Office procedures, evidentiary support for a reason for combining two references is undoubtedly still a requirement of a *prima facie* case of obviousness. See Memorandum of Margaret A. Focarino, Deputy Commissioner for Patent Operations, May 3, 2007 ("in formulating a rejection under 35 U.S.C. 103(a) based upon a combination of prior art elements, it remains necessary to identify the reason why a person of ordinary skill in the art would have combined the prior art elements in the manner claimed . . ."). Indeed, current Supreme Court precedent recognizes that the ability to "merely demonstrat[e] that each of its elements was, independently, known in the prior art" is insufficient to establish obviousness. See *KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398; 127 S. Ct. 1727, 167 L. Ed. 2d 705 (U.S. 2007) (holding that obviousness cannot be proven **"merely by demonstrating that each of its elements was, independently, known in the prior art . . ."**) (emphasis added). Rather, it is "important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the [prior art] elements." *Id.* at 1741. A proper "reason" must also have a **rational underpinning**, which must be articulated in the record. *Id.* (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) ("[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness")). In determining whether or not to combine references, it is important to note that it is improper to combine references where the references teach away from their combination. *In re Grasselli*, 713 F.2d 731, 743 (Fed. Cir. 1983).

In making the combination of Bright and Fotland, the Office Action notes that Bright “does not teach an electric filed (sic) in the chamber for enhancing the charging of particles.” *Office Action dated February 15, 2011, p. 5*. The reason stated for the combination, though, is that Fotland allegedly states “that particles are commonly charged by trio-charging (sic) means and the tribo-charging means may combine with other ion generating sources to improve charging efficiency...” *Id.* (emphasis added). It is alleged then, that it would have been obvious to combine the triboelectric charging of Bright with the ion generating source of Fotland to arrive at the claimed invention.

Applicant submits that Fotland actually teaches nothing of the combination of triboelectric charging with an ion generating source, and that therefore, the combination of references is improper. Specifically, Fotland never mentions the possibility of triboelectric charging in combination with any ion generating source at all. Rather, Fotland states triboelectric charging is known in the art, but then goes on to state that triboelectric charging is inefficient and that other particle charging methods are preferred because they can “achieve charge-to-mass ratios at least ten times greater than is possible with triboelectric charging.” *Fotland, paragraph [0020]*. Instead of teaching the possibility of combining tribocharging with another ion generating source as is alleged in the Office Action, Fotland only discloses the use of one or the other. There is no indication that a combination of the two would render any useful purpose whatsoever. Without this alleged support, there is no other articulated reason with a rational underpinning for the combination of Bright and Fotland, and the *prima facie* case of obviousness is lacking.

Further, Bright teaches away from its combination with Fotland, which weighs heavily against a finding of obviousness based on their combination. First, Bright teaches that “[e]xcessive charge may cause electrical breakdown and is to be avoided...” *Bright, col. 2, lines 55-57*. Because Fotland teaches that other ion generating means can produce charges up to ten times greater than triboelectric charging, such an excessive charge would be counterproductive to Bright’s invention. That is, an inventor looking to “improve charge efficiency” in Bright’s invention would not want to increase the charge of the particles by

ten-fold as Fotland discloses because it may cause electrical breakdown, which Bright expressly states should be avoided.

Additionally, Bright teaches that “the surface material of the rotor should also be capable of charge replenishment (or leakage) to prevent the accumulation of a layer of charge which would repel the partly charged powder.” *Id.*, col. 2, lines 62-65. Fotland, on the other hand, teaches that it is desirable to accumulate a layer of charge. Specifically, Fotland states that “[c]harged particles from the aerosol within the deposition zone are electrostatically attracted to the substrate 1 thereby forming a deposit 15 as shown in FIG. 2.” *Fotland*, paragraph [0015].

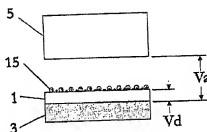


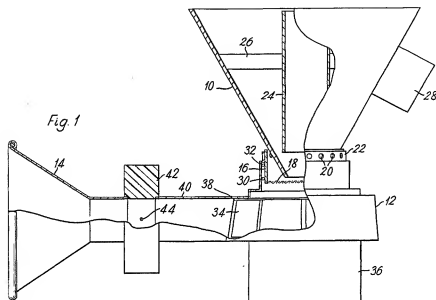
FIG. 2

These contradictory purposes indicate that a combination of the two references would be improper. That is, an inventor considering the invention of Bright would not look to Fotland to solve particle charging issues because the reasons and nature of the charging of the particles in Fotland are counterproductive to those of Bright. The reverse is true as well. To combine Bright with Fotland would change the principle of operation of either reference, and thus the combination is insufficient to establish obviousness. MPEP 2143.03 (“If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious.”). Accordingly, the combination of Bright and Fotland is inappropriate in an obviousness rejection of Applicant’s claims.

For each of the above reasons, Applicant respectfully requests reversal of the rejections and remand with instructions for allowance of all claims.

Claim 3

Claim 3, in addition, is independently allowable because it requires that the chamber define a generally annular space around an outer surface of the rotor for receiving the particle mixture. In rejecting this claim, the Office Action merely states that “the rotor fan 34 of Bright is positioned within the housing 40 and the fluidized powder falls on to the fan rotor 34.” *Office Action dated February 15, 2011, p. 6.*



Because Bright fails to disclose the annular requirement of claim 3, Applicant submits that the claim is allowable and requests remand with instructions for allowance accordingly.

Claim 4

In addition to the above reasons, claim 4 is independently allowable over Bright and Fotland. Claim 4 requires that “the outlet is positioned below and generally opposite the inlet.” The Office Action alleges that this claim is obvious because “depending upon the orientation [of Bright], the inlet of the housing is on one end of the housing while the outlet is on the other side of the housing (Figure 1).” *Office Action dated February 15, 2011, p. 6.* As is clearly indicated by Bright’s Figure 1, the inlet (i.e. the hopper 10) is above the

chamber (i.e. housing 40), but the outlet 14 is not below and opposite the inlet as the claim requires. Rather, the outlet 14 is well to the left of the inlet 10.

Applicant also notes that the orientation of Bright cannot change as the Office Action suggests in order to “fit” the claim language. That is, the inlet must remain in the orientation in Figure 1. This is because in order for Bright to operate, “[t]he fluidised powder from the sieve 18 **falls** on to the rotor 34 of the fan 12....” *Bright*, col. 2, lines 39-40. If Bright’s invention were oriented at an angle such that the outlet 14 were positioned below and opposite the inlet 10, any fluidized powder coming through the inlet would not fall from the sieve 18 onto the rotor 34. This would result in Bright being ineffective. As stated above, any change such as this that would alter the principle of operation of the prior art cannot be the basis of an obviousness rejection. See MPEP 2143.03. Accordingly, claim 4 cannot be obvious in view of Bright. Therefore, Applicant respectfully requests claim 4 be allowed.

Claims 10 and 28

Additionally, claims 10 and 28 are uniquely patentable over the combination of Bright and Fotland. Claims 10 and 28 require that the electric field be created by “a variable source having **a first lead connected to the rotor** (or means for frictionally charging the particles in the chamber) and a second lead connected to a wall of the chamber.” In support of the rejection, the Office Action alleges that Fotland teaches connecting a “first lead electrode 39 co-axially positioned within the housing 37 and a second lead to the second electrode 25 on the wall of the housing 37.” *Office Action dated February 15, 2011*, p. 6. The Office Action continues by stating that “since the rotor 34 is co-axially positioned within the housing 40 of Bright” (Figure 1 above) it would have been obvious to connect the first lead to the rotor in the combination of the references. That is, the only reason stated for the obviousness of attaching the first electrode to the rotor is that the combination of the references would result in the rotor being positioned in the location that the first electrode of Fotland is already located, namely co-axially within the housing.

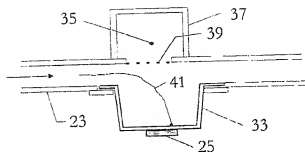


FIG. 5

Contrary to the above assertion, Figure 5 of Fotland clearly shows that the first electrode 39 is *not* co-axially positioned within the housing 37, but rather is positioned on the *periphery* of housing 37. That is, the border of housing 37 consists of three (3) walls and the screen 39 surrounding the corona wire 35. Fotland highlights this fact by stating that “[h]ousing 37 may be slightly pressurized to prevent the migration of aerosol particles into the corona cavity.” *Fotland, paragraph [0022]*. This discrepancy undermines the reasoning for the obviousness rejection of claims 10 and 28. That is, placing the rotor of Bright in the location of the first electrode of Fotland would render the combination useless for its intended purpose. The rotor could not rotate if it comprised a portion of the periphery of the housing, thereby being unable to charge the particles. Further, as shown in Figure 5, the particles of Fotland travel along path 41, such that they never actually contact the screen and first electrode 39. If the rotor were placed in that location, the rotor would never contact the particles, and therefore would never be able to charge the particles. Such discrepancies require that the references cannot be combined in rejection of claims 10 and 28.

Because the Office Action provides no further reason for the obviousness of claims 10 and 28 other than the unsupportable “similar location” argument, Applicant submits that at least claims 10 and 28 are allowable. Reversal of the rejections and instructions for allowance are therefore respectfully requested.

Claim 35

Claim 35 is also independently allowable. It requires that the rotor comprise a cylinder. The only basis for the rejection is that the rotor 34 of Bright allegedly comprises a cylinder. However, the disclosure of Bright never states that the rotor 34 is a cylinder.

Further, Figure 1 above suggests that the shape of rotor 34 is not cylindrical. Rather, the sides seem to be angled, sloping inward from bottom to top. Further, Bright's rotor 34 includes blades which provide a larger surface area for contacting the particles. Blades, clearly, are not elements of a cylinder. In short, there is no support in Bright for a rotor in the shape of a cylinder. Therefore, the rejection of at least claim 35 is inappropriate.

Claim 36

Similarly, claim 36 is independently allowable, as it requires that the rotor be mounted to spin about a generally **horizontal** axis. The rotor 34 of Bright, on the other hand, spins about a **vertical** axis. In fact, the cut-away of Bright's Figure 1 reveals the central, vertical axis extending upward from motor 36 about which the rotor 34 spins. As stated previously, the orientation of Bright's invention cannot be rotated 90° because Bright requires that the fluidized powder *fall* onto the rotor 34. There is also no indication that Bright's invention would effectively operate if rotated to the alternate orientation. Because Bright does not reveal the requirement of a rotor spinning about a horizontal axis and the Office Action indicates no ability to alter Bright so that such a requirement would be possible, claim 36 must be allowed.

Claim 37

Claim 37 is independently patentable as well. It requires that the rotor *not* include any external blades. The Office Action alleges that such a requirement is obvious because, while Bright's rotor includes blades, "omission of an element and its function is obvious **if the function of the element is not desired.**" *Office Action dated February 15, 2011, p. 7* (emphasis added). The Action continues to allege omission of the blades would be obvious if a large surface is not desired.

This application of the test, however, is inapposite. In order for an omission of an element to be obvious, its *function* must not be desired. The surface area of the blades (which the Office Action alleges is not desired) is not the *function* of the element at all, but rather is only a feature of the element. The function of the element (i.e. the fan blades) is to

aid in charging of the particles. Removal of this function would render the Bright invention useless, or at least severely limit its use. As stated above, any change such as this that would alter the principle of operation of the prior art cannot be the basis of an obviousness rejection. *See* MPEP 2143.03.

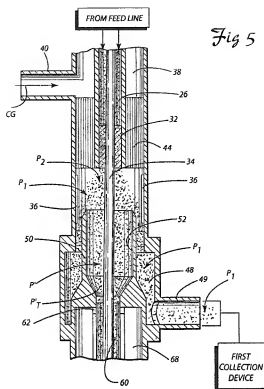
Further, Applicant's invention, strives not to *limit* the charging of particles (as would be the case of removing blades from the Bright invention), but rather seeks to charge particles and even adds an electrical field to *enhance* the charging of the particles. Therefore, the function of the blades (i.e. charging particles) is highly desired, in complete opposition to the contention of the Office Action. Accordingly, it is *not* obvious to remove the blades of Bright in order to arrive at the invention of claim 37. Applicant submits, then, that claim 37 is allowable and requests remand with instructions for allowance.

D. Rejection Under 35 U.S.C. §103(a) Over Bright in View of Fotland, and Further in View of U.S. Patent No. 6,498,313 to Stencel, et al ("Stencel I").

Additionally, claims 5, 6, 24 and 25 are rejected under 35 U.S.C. §103(a) as allegedly obvious over Bright in view of Fotland and further in view of U.S. Patent No. 6,498,313 to Stencel ("Stencel I"). For the reasons stated above in Section C, each claim is patentable as Bright is not analogous art and the combination of Bright and Fotland is inappropriate.

Claims 5 and 24

Additionally, claims 5 and 24 are independently patentable. Each require a partition extending into the chamber adjacent the rotor (or frictionally charging means) "performing the dual function of preventing the particle mixture from prematurely entering the outlet in one direction and guiding the particle mixture to the outlet in the other direction." In alleging obviousness, the Office Action states that Stencel I discloses a partition 50 with an insert 62 as a flow divider for promoting contacts between particle-to-particle/particle-to-wall in order to recharge particles. *Office Action dated February 15, 2011, p. 10*. This alleged enhanced charging efficiency is the stated motivation for adding the partition/insert of Stencel I to the combination of Bright and Fotland.



Initially Applicant notes that the partition/insert of Stencil I is generally annular in shape, and therefore could not simply be added to any combination of Bright and Fotland to perform the dual function of preventing early exit of particles in one direction and guiding particles in the other direction as the claims require. The Office Action does not specify how such an addition would be capable of operation, but merely states that “[t]he partition/insert of Bright/Fotland/Stencil is fully capable of performing the claimed functions.” *Office Action dated February 15, 2011, p. 10*. Because of the vastly different shapes and functions of Stencil’s partition/insert and Applicant’s partition, the Examiner’s above statement alone is simply conjecture. As the Federal Circuit recently warned in a similar situation, “[c]onjecture does not supply the requisite substantial evidence to support . . . rejections” based on obviousness. *In re Kao*, ____ F.3d ____, No. 2010-1307 (Fed. Cir. May 13, 2011). This same standard must be equally applied to the Examiner’s analysis in the Office Action. Stated another way, the record provides no articulated reasoning indicating that the requirements of claims 5 and 24 would be possible from the combination of Stencil I with Bright and Fotland. As such, at least claims 5 and 24 must be allowed.

Claims 6 and 25

For the reasons stated in relation to claims 5 and 24, claims 6 and 25 are also allowable over the combination of Bright, Fotland, and Stencel I. Additionally, Stencel I does not disclose a partition/insert which is adjustable at all. Further, the Office Action provides no reason why an insert 62 which is adjustable would in any way improve charging efficiency. Without an articulated reason with a rational underpinning, the *prima facie* case of obviousness is lacking.

The Office Action further alleges that adjustability, where needed, involves only routine skill in the art. *Office Action dated February 15, 2011, p. 10*. This is an overgeneralization which does not apply to this situation. Making an element adjustable is only routine if there is recognized need for the adjustment in the art. *See In re Stevens*, 212 F.2d 197 (CCPA 1954) (Claims were directed to a handle for a fishing rod wherein the handle has a longitudinally adjustable finger hook, and the hand grip of the handle connects with the body portion by means of a universal joint. The court held that adjustability, where needed, is not a patentable advance, and *because there was an art-recognized need for adjustment* in a fishing rod, the substitution of a universal joint for the single pivot of the prior art would have been obvious). Therefore, in order for this adjustment to be routine, there must have been a recognized need to adjust the insert for improving charging efficiency. As the Office Action provides no such evidence, this statement must be taken as conjecture, which the *Kao* court cautioned against.

For each of the above reasons, Applicant submits that claims 5, 6, 24, and 25 are patentable over Bright, Fotland, and Stencel I. Accordingly, remand with instructions for allowance is respectfully requested.

E. **Rejection Under 35 U.S.C. §103(a) Over Bright in View of Fotland, and Further in View of U.S. Patent No. 5,755,333 to Stencel, et al (“Stencel II”).**

The Office Action also rejects claims 11 and 29 under 30 U.S.C. §103(a) as allegedly obvious over Bright and Fotland and further in view of U.S. Patent No. 5,755,333 to Stencel,

et al (“Stencel II”). For at least the reasons stated in Section C, the Bright is not analogous art and the combination of Bright and Fotland is inappropriate. Therefore, claims 11 and 29 should be allowed.

Further and respectfully, the alleged reason for combining Stencel II with the Bright/Fotland device is severely lacking. The stated reason is that “it would have been obvious... to include a separation section as suggested by Stencel in order to separate charged particles with the device of Bright/Fotland if separation is desired.” *Office Action dated February 15, 2011, p. 11*. Essentially, this boils down to an allegation that it would be obvious to include a separator if separation is desired. Yet no reason for desiring separation is provided. That is, the Action indicates no reason why separation would be desired in the Bright/Fotland combination. Both Bright and Fotland are directed toward inventions which deposit particles, and have nothing to do with separation. The Action provides no articulated reason with a rational underpinning for bridging the gap between a particle depositing apparatus and a particle separation apparatus. Therefore, a *prima facie* case of obviousness is lacking with respect to claims 11 and 29. Accordingly, Applicant respectfully requests remand for allowance.

F. Rejection Under 35 U.S.C. §103(a) Over Stencel II in View of Bright and Further in View of Fotland.

Finally, claims 1-4, 8, 10-11, 22, 23, 26, 28-30, and 32-37 are rejected under 35 U.S.C. 103(a) as allegedly obvious over Stencel II in view of Bright and further in view of Fotland. For at least the reasons stated in Section C, Bright is not analogous art and the combination of Bright and Fotland is inappropriate, and therefore the rejections should be overturned.

Additionally, the combination of Stencel II with Bright is inappropriate. In the rejection, the Office Action admits that Stencel II does not disclose a rotatable tribocharging rotor, but alleges that Bright discloses such an element in rotor 34. The rejection further alleges that it would have been obvious to utilize the rotor fan of Bright in the device of Stencel II in order to improve charging efficiency. This reason for the combination,

however, does not take into account the overall configuration or operation of either invention.

Stencel II discloses an apparatus for static, triboelectric centrifugal separation. The feedstock including the particles to be separated must enter the triboelectric section 12 at a high velocity of substantially 10-300 feet/second. *Stencel II*, col. 4, lines 42-46. This high speed is important as repeated contact with the core member 22 and the outer wall 24 is what results in the frictional triboelectric charging of the particles. *Id.* at col. 4, lines 47-57. This high speed is important in causing repeated contacts because there are no moving parts within the triboelectric section 12 to cause such contact between particles. The particles then travel along an uninterrupted spiral flowpath or course of travel through chamber 31. *Id.* at col. 4, lines 59-61. As the volume of particles increases along the downward flowpath, the velocity of particles slows to 1-25 feet/second. *Id.* at col. 4, l. 63 – col. 5, l. 1. Stencel II stresses that this slowing of particles “is an important factor which aids in the effectiveness of the subsequent separation by means of the electrostatic forces.”

Bright, on the other hand, discloses an apparatus in which a fluidized powder must fall onto a fan rotor rather than be sprayed at high speeds. This aids in triboelectric charging as the powder then “receives a large number of impacts with the fan rotor 34 and the inner lining 38 of the housing of the fan. *Bright*, col. 2, lines 39-45.

Combining the fan of Bright with the chamber of Stencel II would hinder the function of both apparatuses. That is, the introduction of a fan would interrupt the spiral flow path of Stencel II as well as interfere with the slowing of particles, which Stencel II specifically notes as an important factor in the overall invention. Further, imparting particles at a high velocity toward the fan of Bright, rather than simply allowing the powder to fall, would cause a large percentage of particles to bypass the fan altogether, thereby negating any improvement introduced by a rotor with increased surface area. Therefore, an inventor endeavoring to efficiently tribo-charge particles would not combine the rotor fan of Bright with the device of Stencel II, as the combination would severely hinder the operation of either device. Accordingly, an obviousness rejection based on their combination is

inappropriate and Applicant respectfully requests remand with instructions for allowance of all claims.

Claims 10 and 28

In addition to the reasons stated above, claims 10 and 28 are independently patentable over any combination of Bright and Fotland for the reasons stated in Section C with respect to those claims.

Claim 35

In addition to the reasons stated above, claim 35 is independently patentable over any combination of Bright and Fotland for the reasons stated in Section C with respect to that claim.

Claim 36

In addition to the reasons stated above, claim 36 is independently patentable over any combination of Bright and Fotland for the reasons stated in Section C with respect to that claim.

Claim 37

In addition to the reasons stated above, claim 37 is independently patentable over any combination of Bright and Fotland for the reasons stated in Section C with respect to that claim.

G. Conclusion

Applicant submits that for the reasons set forth above, each rejection in the Office Action dated February 15, 2011 is flawed and that all claims are in condition for allowance. It is therefore respectfully requested that the rejections of all pending claims be reversed and the application remanded to the Examiner for issuance of a prompt Notice of Allowance. To the extent any fees are due beyond those authorized in the fee transmittals for filing a brief in

support of a Notice of Appeal, the undersigned authorizes their deduction from Deposit Account No. 11-0978.

Respectfully submitted,
KING & SCHICKLI, PLLC

A handwritten signature in dark ink, appearing to read 'Andrew D. Dorisio', with a stylized flourish at the end.

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VIII. CLAIMS APPENDIX

The claims on appeal are 1-6, 8, 10, 11, 22-26, 28-30, and 32-37. Of those claims, 4, 6, 8, and 25 remain as originally presented and all other claims are as previously presented.

1. (Previously presented) An apparatus for intended use in charging particles in a particle mixture as part of a system for separating particles from a feedstream comprising a fluid flow including the particle mixture, comprising:

a chamber including an inlet for receiving the particle mixture and an outlet for discharging the particle mixture;

a tribocharging rotor rotatably mounted in the chamber, the rotor having a generally non-permeable outer surface for contacting and frictionally charging the particles of the particle mixture;

an electric field in the chamber for enhancing the charging of the particles.

2. (Previously presented) The apparatus according to claim 1, wherein the rotor is non-circular in cross-section.

3. (Previously presented) The apparatus according to claim 1, wherein the chamber defines a generally annular space around an outer surface of the rotor for receiving the particle mixture.

4. (Original) The apparatus according to claim 1, wherein the outlet is positioned below and generally opposite the inlet.

5. (Previously Presented) The apparatus according to claim 1, further including a partition projecting into the chamber adjacent the rotor, said partition performing the dual function of preventing the particle mixture from prematurely entering the outlet in one direction and guiding the particle mixture to the outlet in the other direction.

6. (Original) The apparatus according to claim 5, wherein the partition is adjustable to vary the distance between an end of the partition and the rotor.

7. (Cancelled)

8. (Original) The apparatus according to claim 1, wherein the rotor rotates at a rotational speed of between about 1,200 and 10,000 revolutions per minute.

9. (Cancelled)

10. (Previously presented) The apparatus according to claim 1, wherein the electric field is created by a variable voltage source having a first lead connected to the rotor and a second lead connected to a wall of the chamber.

11. (Previously presented) A particle separation system including a feedstream for delivering the particle mixture to the inlet of the apparatus of claim 1 and an electrostatic separator for receiving the particle mixture from the outlet and separating at least one species of particles from the particle mixture.

12 - 21. (Cancelled)

22. (Previously presented) An apparatus for intended use in charging particles in a particle mixture as part of a system for separating particles from a fluid flow including the particle mixture, comprising:

a wall forming a chamber including an inlet for receiving the particle mixture and an outlet for discharging the particle mixture; and

rotatable means for frictionally charging the particles of the particle mixture in the chamber; and

means for forming an electric field in the chamber.

23. (Previously presented) The apparatus according to claim 22, wherein the rotatable means for frictionally charging the particles of the particle mixture in the chamber comprises a rotor rotatably mounted in the chamber, the rotor having a generally non-permeable outer surface.

24. (Previously presented) The apparatus according to claim 22, further including a partition projecting into the chamber adjacent the means for frictionally charging the particle mixture in the chamber, said partition performing the dual function of preventing the particle mixture from prematurely entering the outlet in one direction and guiding the particle mixture to the outlet in the other direction.

25. (Original) The apparatus according to claim 22, wherein the partition is adjustable to vary the distance between an end of the partition and the rotatable means for frictionally charging the particles in the chamber.

26. (Previously presented) The apparatus according to claim 22, further including a motor for rotating the rotatable means for frictionally charging the particles of the particle mixture.

27. (Cancelled)

28. (Previously presented) The apparatus according to claim 22, wherein the means for forming the electric field in the chamber comprises a variable voltage source having a first lead connected to the means for frictionally charging the particles in the chamber and a second lead connected to the wall of the chamber.

29. (Previously presented) A particle separation system including a feedstream for delivering the particle mixture to the inlet of the apparatus of claim 22 and an electrostatic separator for receiving the particle mixture from the outlet and separating at least one species of particles from the particle mixture.

30. (Previously presented) A system for intended use in separating particles from a fluid flow, comprising:

- a feedstream including the fluid flow and a particle mixture comprising at least two species of particles;

- a wall defining a chamber including an inlet for receiving the feedstream including the particle mixture and an outlet for discharging the particle mixture;

- a rotor rotatably mounted in the chamber, the rotor having a generally non-permeable outer surface for contacting and assisting in charging the particles in the particle mixture;

- a first electric field in the chamber for enhancing the charging of the particles;

and

- a separator downstream of the chamber outlet for separating at least one species of the charged particles from the particle mixture in the fluid flow.

31. (Cancelled)

32. (Previously presented) The apparatus of claim 30, wherein the separator includes a second electric field.

33. (Previously presented) In a particle separation system including an electrostatic separator for separating one or more species of particles from a particle mixture included in a feed stream with a fluid flow, the improvement comprising a chamber including an inlet for receiving the feed stream including the particle mixture and an outlet for discharging the particle mixture to the electrostatic separator and a rotor rotatably mounted in the chamber,

the rotor having a generally non-permeable outer surface for contacting and frictionally charging the particles in the particle mixture prior to delivery of the particle mixture to the electrostatic separator, and further including an electric field in the chamber.

34. (Previously presented) The apparatus of claim 1, wherein the outer surface of the rotor is smooth and continuous.

35. (Previously presented) The apparatus of claim 1, wherein the rotor comprises a cylinder.

36. (Previously presented) The apparatus of claim 1, wherein the rotor is mounted to spin about a generally horizontal axis.

37. (Previously presented) The apparatus of claim 1, wherein the rotor does not include any external blades.

IX. EVIDENCE APPENDIX

None.

X. RELATED PROCEEDINGS APPENDIX

None.